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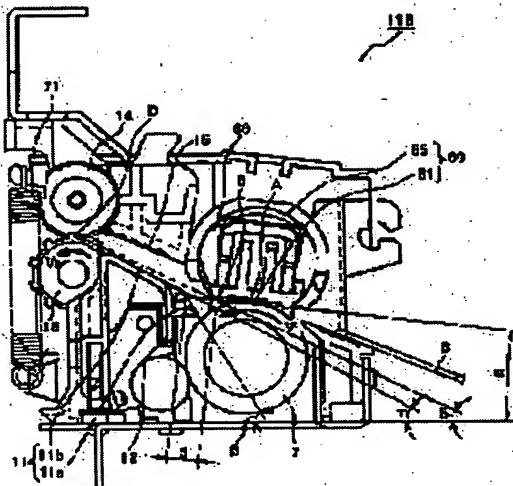
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(54) FIXING DEVICE AND IMAGE FORMING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a fixing device where generation of bottom curling of recording material is further decreased.

SOLUTION: In this device, a bottom part guide 11 in between a fixing nip A and a pair of paper ejecting rolls 13, 14 is composed of an entrance side guide part 11a provided in a vicinity of an ejecting side of the fixing nip part A to which a leading tip of the recording material is abutted and an exit side guide part 11b following the entrance side guide part 11a in a line extended from a through roll nip carrying path that is passed through the fixing nip A, the entrance side guide part 11a is formed to be a surface more inclined than the exit side guide part 11b, an inclined angle of a straight line by which an end of ejected paper at the fixing nip A and the nip of the pair of paper ejecting rolls is connected is made greater than an inclined angle of a carrying path of the recording material that is passed through the fixing nip A and carrying speed of the recording material by the pair



of paper ejecting rolls 13, 14 is made higher than the carrying speed of the recording material at the fixing nip.

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CLAIMS

[Claim(s)]

[Claim 1] A compression heating conveyance means to make said record material carry out heating fixing of said toner image by making the compression section pass record material which supported a non-established toner image A lower guide to which it turns and shows record material which passed said compression section to a delivery roller pair It is the anchorage device equipped with the above. Said lower guide On a conveyance way production of record material which opposite arrangement is carried out at a delivery side of said compression section, and passes said compression section It has the entrance-side guide section which a tip of record material established in a discharge close-attendants side of said compression section contacts, and the outlet side guide section which stands in a row in said entrance-side guide section, and is characterized by forming said entrance-side guide section in a steep incline rather than said outlet side guide section.

[Claim 2] A compression heating conveyance means to make said record material carry out heating fixing of said toner image by making the compression section pass record material which supported a non-established toner image A lower guide to which it turns and shows record material which passed said compression section to a delivery roller pair It is the anchorage device equipped with the above. Said lower guide On a conveyance way production of record material which opposite arrangement is carried out at a delivery side of said compression section, and passes said compression section The entrance-side guide section which a tip of record material established in a discharge close-attendants side of said compression section contacts, Have the outlet side guide section which stands in a row in said entrance-side guide section, and said entrance-side guide section is formed in a steep incline rather than said outlet side guide section. It is characterized by enlarging a tilt angle of a straight line which connected a delivery edge of said compression section, and nip of said delivery roller pair rather than a tilt angle of a conveyance way of record material which passes said compression section.

[Claim 3] A compression heating conveyance means to make said record material carry out heating fixing of said toner image by making the compression section pass record material which supported a non-established toner image A lower guide to which it turns and shows record material which passed said compression section to a delivery roller pair It is the anchorage device equipped with the above. Said lower guide On a conveyance way production of record material which opposite arrangement is carried out at a delivery side of said compression section, and passes said compression section The entrance-side guide section which a tip of record material established in a discharge close-attendants side of said compression section contacts, Have the outlet side guide section which stands in a row in said entrance-side guide section, and said entrance-side guide section is formed in a steep incline rather than said outlet side guide section. It is characterized by having enlarged a tilt angle of a straight line which connected a delivery edge of said compression section, and nip of said delivery roller pair, and making a bearer rate of record material by said delivery roller pair larger than a record material bearer rate of said compression heating conveyance means rather than a tilt angle of a conveyance way of record material which passes said compression section.

[Claim 4] Said compression heating conveyance means is an anchorage device according to claim 1, 2,

or 3 characterized by having a heating object supported by base material fixed, a heat-resistant film conveyed carrying out an opposite pressure welding to said heating object, and a pressurization member which sticks record material on said heating object through said heat-resistant film.

[Claim 5] Said lower guide is an anchorage device according to claim 1, 2, 3, or 4 characterized by preparing two or more ribs which are prolonged along the conveyance direction of record material and offer a guide side of record material in the conveyance direction of record material, and the direction which intersects perpendicularly.

[Claim 6] Said two or more ribs are anchorage devices according to claim 5 characterized by preparing in the entrance-side guide section of said lower guide.

[Claim 7] An anchorage device according to claim 5 or 6 characterized by preparing lobe material projected a little rather than said rib to said lower guide among said two or more ribs.

[Claim 8] An anchorage device according to claim 1, 2, 3, or 4 characterized by making into the upper part a straight line which connected a delivery edge of said compression section, and nip of said delivery roller pair rather than a guide side of said lower guide.

[Claim 9] Claims 5 and 6 characterized by making into the upper part a straight line which connected a delivery edge of said compression section, and nip of said delivery roller pair rather than lobe material of said lower guide, or an anchorage device given in seven.

[Claim 10] Said lobe material is an anchorage device according to claim 7 or 9 characterized by the surface having low friction nature.

[Claim 11] Said lobe material is an anchorage device according to claim 7 or 9 characterized by being the body of revolution supported free [rotation] along the conveyance direction of record material.

[Claim 12] Said lobe material is an anchorage device according to claim 11 characterized by being the ball bearing supported free [rotation].

[Claim 13] Claim 1 characterized by forming the outlet side guide section in the shape of a field while forming the entrance-side guide section of said lower guide in the shape of [two or more] a rib tread type thru/or an anchorage device of any one publication of three.

[Claim 14] Claim 1 to which whenever [tilt-angle / of an entrance-side guide side of said lower guide / and angular relation / of said compression section] is characterized by 40-degree or more being 65 degrees or less thru/or an anchorage device of any one publication of three.

[Claim 15] Image formation equipment characterized by having claim 1 thru/or an anchorage device of any one publication of 14.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to image formation equipments, such as an anchorage device which carries out heating fixing of the toner image formed on record material and electrophotography equipment which has this anchorage device, and electrostatic recording equipment.

[0002]

[Description of the Prior Art] As an image heating anchorage device which carries out heating fusion of the image supported on record material conventionally, and is fixed to this record material, it has the heating roller maintained by predetermined temperature and the pressurization roller which has an elastic layer and carries out a pressure welding to this heating roller, and the heat roller fixing method heat is used abundantly, carrying out pinching conveyance in the record material in which the non-established toner image was formed with both these rollers.

[0003] However, the time amount which forbids image formation actuation until it starts this heat roller fixing method to predetermined temperature the 1st, The so-called wait time is quite long required, and since heat capacity is [2nd] required, comparatively big power is required. Since roller temperature is an elevated temperature with a rotation roller, a heat-resistant special bearing is required for the 3rd. Since it became the configuration that 4th a direct hand touches a roller and there was risk, the protection member was required, the record member coiled around the roller with roller fixing temperature and curvature the 5th, and there was a defect, such as becoming a jam generating cause.

[0004] Then, the fixing method of the film heating method which these people proposed Since a low heat-capacity linear heating object can be used in contrast with heat anchorage devices, such as an above-mentioned heat roller fixing method and the above-mentioned belt driving method learned in addition to this, a flash plate fixing method, and an oven-fusing method, It is that the power is saved (quick-start nature), since an established point and an isolation point can set up separately, offset is prevented, in addition it has an advantage with the various solvable defects of other method equipments, and is effective.

[0005] The method, equipment, etc. of the indication to JP,63-313182,A concerning the proposal of these people's point belong to this. The heat-resistant film of thin meat (sheet), This heating object is countered, and it is arranged at the migration driving means of this film, the heating object arranged by carrying out fixed support on the other hand on both sides of this film at the field side, and an another side side side, and has the pressurization member to which the ***** support side of the record material which should carry out image fixing through this film to this heating object is stuck.

[0006] Said film carries out transit migration of the time of image fixing activation at the same speed at least in the record material and the forward direction by which conveyance installation is carried out between a film and a pressurization member and which should carry out image fixing. By passing the fixing nip section formed with the pressure welding of a heating object and a pressurization member on both sides of a transit migration film, the ***** support side of record material is heated with a heating

object through a film, heat energy is given to *****, and melting of the record material is softened and carried out to it.

[0007] Subsequently, after a toner's cooling [alienation or] a film and record material and solidifying, making a film and record material estrange is performed.

[0008] With the anchorage device of such a film heating method, the energization exoergic layer which makes straight side the migration passage direction of record material and the crossing direction is prepared, and each part of the effective overall-length region of an exoergic layer generates heat with the calorific value per unit length by voltage being impressed to the inter-electrode one of longitudinal both the terminal areas of this energization exoergic layer for energization. The effective overall-length region of this exoergic layer has the length corresponding to the width of face (maximum width, maximum size width of face) of the record material of the maximum size which can be used being able to supply the image formation equipment incorporating an anchorage device.

[0009] At the time of fixing activation, energization pyrexia is carried out with calorific value [be / no relation to the size of the size width of face of use record material] predetermined [per unit length] in the effective overall-length region of an exoergic layer.

[0010]

[Problem(s) to be Solved by the Invention] However, to the anchorage device of a film heating method like the above-mentioned conventional example, it is possible to cause the following problems.

[0011] Drawing 10 shows the anchorage device of the conventional film heating method.

[0012] As are shown in (a) of drawing 10, and the fixing nip section A is formed and it is shown in (b) of drawing 10 on both sides of the cylinder-like fixing film 65 with the pressure welding of the heating object 61 of an abbreviation flat configuration, and the pressurization member 7 of a profile of roller, a peculiarity tends to attach the record material S which passes this fixing nip section A to the pressurization member 7 side. That is, it becomes easy to discharge in the state of bottom curl (for it to be a convex condition to facing up). At the tip of record material, it is especially easy to attach this curl.

[0013] Moreover, since heat energy was momentarily given to the record material S through a film 65 using the heating object 61 of low heat capacity and an image was fixed, as shown in (c) of drawing 10, the temperature gradient with the pressurization member 7 might be large especially immediately after equipment starting, curl-under record material S orientation might become remarkably large, and Siwa might be produced in the record material S depending on the case.

[0014] Moreover, that curl and Siwa occur in the record material S led also to the loading performance degradation of the record material after discharge, and both sides and the trouble at the time of feeding in ADF, and it not only spoils the grace of this discharge record material, but had caused reliability aggravation of equipment itself.

[0015] Then, these people have proposed preventing curl of record material by starting the guide 80 of a nip outlet side toward the upper part from the lower part of extended Rhine 81 of nip, as shown in drawing 11.

[0016] However, the inclination of this guide was comparatively loose and was not enough for correction of the comparatively big curl produced in record material, especially the big curl produced at the tip of record material.

[0017] The purpose of invention concerning this application tends to offer the anchorage device and image formation equipment which reduce generating of curl of record material further.

[0018]

[Means for Solving the Problem] The 1st configuration of an anchorage device which realizes the purpose of invention concerning this application A compression heating conveyance means to make said record material carry out heating fixing of said toner image by making the compression section pass record material which supported a non-established toner image; In an anchorage device which has a lower guide to which it turns and shows record material which passed said compression section to a delivery roller pair said lower guide On a conveyance way production of record material which opposite arrangement is carried out at a delivery side of said compression section, and passes said compression section It has the entrance-side guide section which a tip of record material established in a discharge

close-attendants side of said compression section contacts, and the outlet side guide section which stands in a row in said entrance-side guide section, and said entrance-side guide section is formed in a steep incline rather than said outlet side guide section.

[0019] The 2nd configuration of an anchorage device which realizes the purpose of invention concerning this application A compression heating conveyance means to make said record material carry out heating fixing of said toner image by making the compression section pass record material which supported a non-established toner image, In an anchorage device which has a lower guide to which it turns and shows record material which passed said compression section to a delivery roller pair said lower guide On a conveyance way production of record material which opposite arrangement is carried out at a delivery side of said compression section, and passes said compression section The entrance-side guide section which a tip of record material established in a discharge close-attendants side of said compression section contacts, Have the outlet side guide section which stands in a row in said entrance-side guide section, and said entrance-side guide section is formed in a steep incline rather than said outlet side guide section. A tilt angle of a straight line which connected a delivery edge of said compression section and nip of said delivery roller pair is made larger than a tilt angle of a conveyance way of record material which passes said compression section.

[0020] The 3rd configuration of an anchorage device which realizes the purpose of invention concerning this application A compression heating conveyance means to make said record material carry out heating fixing of said toner image by making the compression section pass record material which supported a non-established toner image, In an anchorage device which has a lower guide to which it turns and shows record material which passed said compression section to a delivery roller pair said lower guide On a conveyance way production of record material which opposite arrangement is carried out at a delivery side of said compression section, and passes said compression section The entrance-side guide section which a tip of record material established in a discharge close-attendants side of said compression section contacts, Have the outlet side guide section which stands in a row in said entrance-side guide section, and said entrance-side guide section is formed in a steep incline rather than said outlet side guide section. A tilt angle of a straight line which connected a delivery edge of said compression section and nip of said delivery roller pair rather than a tilt angle of a conveyance way of record material which passes said compression section is enlarged, and a bearer rate of record material by said delivery roller pair is made larger than a record material bearer rate of said compression heating conveyance means.

[0021] The 4th configuration of an anchorage device which realizes the purpose of invention concerning this application is a configuration of one of the above, and said compression heating conveyance means has a heating object supported by base material fixed, a heat-resistant film conveyed carrying out an opposite pressure welding to said heating object, and a pressurization member which sticks record material on said heating object through said heat-resistant film.

[0022] The 5th configuration of an anchorage device which realizes the purpose of invention concerning this application is a configuration of one of the above, and said lower guide is prolonged along the conveyance direction of record material, and prepares two or more ribs which offer a guide side of record material in the conveyance direction of record material, and the direction which intersects perpendicularly.

[0023] The 6th configuration of an anchorage device which realizes the purpose of invention concerning this application is the 5th above-mentioned configuration, and said two or more ribs are prepared in the entrance-side guide section of said lower guide.

[0024] The 7th configuration of an anchorage device which realizes the purpose of invention concerning this application is the 5th or 6th configuration of the above, and prepares lobe material projected a little rather than said rib to said lower guide among said two or more ribs.

[0025] The 8th configuration of an anchorage device which realizes the purpose of invention concerning this application is the above 1st and a configuration of 2, 3, or 4, and makes the upper part a straight line which connected a delivery edge of said compression section, and nip of said delivery roller pair rather than a guide side of said lower guide.

[0026] The 9th configuration of an anchorage device which realizes the purpose of invention concerning this application is the above 5th and a configuration of 6 or 7, and makes the upper part a straight line which connected a delivery edge of said compression section, and nip of said delivery roller pair rather than lobe material of said lower guide.

[0027] The 10th configuration of an anchorage device which realizes the purpose of invention concerning this application is the above 7th or a configuration of 9, and, as for said lobe material, the surface has low friction nature.

[0028] The 11th configuration of an anchorage device which realizes the purpose of invention concerning this application is the above 7th or a configuration of 9, and said lobe material is taken as body of revolution supported free [rotation] along the conveyance direction of record material.

[0029] The 12th configuration of an anchorage device which realizes the purpose of invention concerning this application is the 11th configuration of the above, and said lobe material uses it as a ball bearing supported free [rotation].

[0030] The 13th configuration of an anchorage device which realizes the purpose of invention concerning this application is the above 1st thru/or the 3rd one of configurations, and it forms the outlet side guide section in the shape of a field while it forms the entrance-side guide section of said lower guide in the shape of [two or more] a rib tread type.

[0031] The 14th configuration of an anchorage device which realizes the purpose of invention concerning this application is the above 1st thru/or the 3rd one of configurations, and whenever [tilt-angle / of an entrance-side guide side of said lower guide / and angular relation / of said compression section] makes it 40 degrees or more 65 degrees or less.

[0032] A configuration of image formation equipment which realizes the purpose of invention concerning this application has an anchorage device of a configuration of one of the above.

[0033]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to details with reference to a drawing.

[0034] (Gestalt of the 1st operation) Drawing 1 - drawing 4 show the gestalt of operation of the 1st of this invention.

[0035] Drawing 4 is a main cross section showing the digital copier in the gestalt of operation of this invention. In this drawing, 130 is a flat-bed scanner and it reads because scan means 108a moves the manuscript O placed on manuscript base glass 130a in the direction of arrow head 108b. 102 is a pressure plate, and a user can open and close it up and down free, and it presses down the manuscript O placed on manuscript base glass 130a. 108 is CCD series which reads an image. 102e is the superior lamella of a scanner and 130b is the side plate of a scanner.

[0036] A manuscript can be read also by the following method. Manuscript base 102b constituted so that two or more manuscripts O could be loaded is prepared in the upper surface of a pressure plate 102. 106 is the manuscript conveyance section which conveys separating one manuscript O at a time, and it reads a manuscript, making the sheet read station 107 convey a manuscript. Here, the manuscript conveyance section 106 is formed in a part of pressure plate 102, and moves up and down with closing motion of a pressure plate 102. 109 is a manuscript paper output tray loading the discharged manuscript.

[0037] The recording device section to which 104 changes from a laser beam printer, and 200 are the cassette feeding section and a record material paper output tray into which 125 loads the record material by which the image formation section and 116 were discharged for the manual paper feed section and 300, and a delivery roller pair and 113 were discharged for an anchorage device and 117.

[0038] The recording device section 104 is arranged at the equipment lower part: the record material S in cassette 112a by which laminating hold of the record material S of general-purpose size was carried out -- every 112b1 feed roller -- dissociating -- a resist roller pair -- 124 amends the skew of the record material S, it is made to synchronize with the print signal from a control section 120, and the image formation section 300 is fed with the record material S.

[0039] And the surface of electrostatic latent-image support slack photoconductor drum 111a is uniformly electrified by live-part material 111b, and this surface is exposed based on image information

with the laser scanner 110.

[0040] By this, an electrostatic latent image is formed on photoconductor drum 111a, the toner as a developer of said image formation section is transferred to the electrostatic latent image on photoconductor drum 111a by developer support slack development sleeve 111c, and a toner image is formed on photoconductor drum 111a.

[0041] And said toner image supported by photoconductor drum 111a is imprinted by imprint roller 111f at the record material S, and said record material S which supported the toner image further is conveyed to an anchorage device 116. 111d is the frame of the cartridge which holds photoconductor drum 111a, live-part material 111b, development sleeve 111c, etc.

[0042] The anchorage device 116 is equipped with the heater unit 60 and the pressurization roller 7 as shown in drawing 1. And it is fixed to the above-mentioned toner image on the record material S with this anchorage device 116, and discharges to up to a paper output tray 113.

[0043] Here, the anchorage device 116 in the gestalt of this operation is a film heating anchorage device as shown in drawing 1, and explains details below.

[0044] In drawing 1, 60 is a heater unit, and 65 is a heat-resistant cylindrical shape-like film and is the film with which the mold release layer which the polyimide film with a thickness of 40-60 micrometers was used [layer] for the substratum, and made the peripheral face (field in contact with record material and a toner image) distribute PTFE in PFA and PFA with a thickness of 5-20 micrometers was formed.

[0045] 61 is a heater as a heating object and this heater 61 considers the thermistor as a temperature detector element which the forming face of the ceramic substrate of the insulation made into straight side, thermal resistance, and low heat capacity, the resistance heating element printed by that surface along with straight side, and the resistance heating element of the above-mentioned ceramic substrate was contacted to the opposite side, and established the direction which intersects perpendicularly in the conveyance direction of the record material S as a basic configuration.

[0046] On the other hand, the pressurization roller 7 as a pressurization member is pressurized by the pressure P1 with the pressurization spring 71 prepared in longitudinal direction both ends to the heater 61, and the rotation drive (counterclockwise rotation) of the pressurization roller 7 is carried out in the conveyance direction of the record material S by the drive system (not shown). Thereby, the heat-resistant film 65 of a cylindrical shape carries out adhesion sliding on the heating element surface of a heater 61, and rotates the perimeter of the film guide 66. Moreover, in order to mitigate the sliding friction of the film inside of a heater at this time, heat-resistant grease is made to intervene among both.

[0047] By the above configuration, the record material S is guided between a film 65 and the pressurization roller 7, and it is fixed to the toner image on the record material S by passing the fixing nip section. Pinching conveyance is carried out by the delivery koro 14 energized by energization means by which it does not illustrate, and the record material S after fixing is delivered to the delivery roller 13 and a delivery roller.

[0048] By drawing 1, here explains the anchorage device 116 concerning the gestalt of this operation to details.

[0049] First, the important section of the fixing assembly in the gestalt of this operation is explained. C and delivery roller nip are set [the fixing heater outlet which is a fixing means edge on A and extension of the fixing nip A about fixing nip] to D for the production of B and a fixing nip tangent, and the intersection of a bottom guide entrance slant face. Here, the guide 11 as a lower guide of a delivery guide under delivery has outlet slant face 11b which is the 2nd guide section of entrance slant face 11a and the downstream which is the 1st guide section of the guide side upstream about the record material migration direction, and it is formed so that the meantime may be smoothly connected with a circle. When gamma and a fixing-delivery angle (angle of Segment BD) are set [the fixing nip angle over a horizontal line] to delta for beta and a guide-under delivery exit angle, alpha and a guide-under delivery inlet angle Moreover, $\alpha < \beta$ ** $\gamma < \beta$ ** $\alpha < \delta$ When it is the pressurization roller (fixing film) speed V1 and the delivery roller speed V2 again, ** $V_1 < V_2$ It is $P_1 > P_2$, when it is ** and is the fixing contact pressure P1 and the delivery roller contact pressure P2. It is set as **.

[0050] Next, the actuation in a fixing assembly is explained. Like the above-mentioned, first, heat and a

pressure are given to the record material S which had the non-established image recorded by the engine side, and it is fixed to it by the fixing nip A, and it obtains a permanent image. The record material S tip progresses with bottom curl orientation after that. However, it is prepared so that above-mentioned alpha<beta and bottom guide entrance slant face 11a may cross in the production and C of a fixing nip tangent, and further, the distance d of the fixing heater outlet B and Above C approaches, and is arranged. Therefore, the tip of the record material S will contact in the hot condition near C, and a travelling direction is changed upward like drawing 3 (a), namely, curl under the tip side of the record material S is corrected. Then, as are shown in drawing 3 (b) and the tip of the record material S leaps up, it advances along with the guide 15 on delivery.

[0051] As it furthermore progresses and is shown in drawing 3 (c), while the record material S is passing into the both sides of the fixing nip A and the delivery roller nip D, the speed of the record material S is governed by the pressurization roller speed V1, namely, record material will be in the condition of sliding from the relation of the above-mentioned ** and ** among 13 or 14 pairs of delivery rollers. At this time, the record material S is drawn out so that it will be enthusiastic with a pin between the fixing heater outlet B-delivery nips D and may draw through at the heater outlet B. therefore, the record material S should continue throughout the **** direction, and roller-nip[upward]-do it -- that is, bottom curl will be corrected.

[0052] Here explains the relation of the amount improvement of curl by whenever [bottom guide entrance tilt-angle]. The amount of curl compared by the max data immediately after discharge of the neglect paper in the H/H environment (an elevated temperature and high-humidity environment) where conditions are the severest. A bottom guide entrance inclination, whenever [angular relation / of fixing nip], (beta-alpha), and the relation of the amount of curl of the record material S are shown in drawing 9 (a) and (b). Whenever [angular relation / of a bottom guide entrance inclination and fixing nip] (beta-alpha) is understood that 40 degrees or more 65 degrees or less are desirable so that more clearly than this drawing. When 35 degrees or less of the effect of the amount improvement of curl are insufficient and 70 degrees was exceeded on the contrary, resistance at the tip of record material became large, and generating of a jam arose.

[0053] Thus, since the grade of entrance slant face 11a of the guide 11 under delivery is comparatively large with the gestalt of this operation Since the grade of outlet slant face 11b which can correct curl (especially curl at the tip of record material) of comparatively big record material in this portion, and follows that entrance slant face 11a is comparatively small Compared with the case where the whole guide under delivery is a steep incline, the conveyance load of record material is mitigable, it is stabilized and record material can be conveyed.

[0054] In addition, with the gestalt of this operation, as shown in drawing 2 , two or more two or more rib 11d was formed in the longitudinal direction at entrance slant face 11a of the guide 11 under delivery, and this rib 11d was made into the contact side with the record material S.

[0055] In the gestalt of this operation, as the quality of the material of the guide 11 under delivery, shaping resin is desirable and PBT and PET which can be equal to 100-150-degree C continuous duty are the optimal.

[0056] In addition, when using the quality of the material of the bottom guide 11 as these resin In consideration of deformation of the guide by thermal expansion, as were shown in drawing 2 , and prepare two or more notch 11c in a longitudinal direction, and it enables it to permit deformation by thermal expansion free to a resin guide and it is shown in drawing 1 It arranges so that the back up plate 12 like the SUS board by which U-bending formation was carried out which cannot expand thermally easily may be made to unite with the guide 11 made of resin under delivery, and it constitutes so that this may acquire a rigid and predetermined configuration.

[0057] Moreover, in the fixing assembly in the gestalt of this operation, power is demonstrated on the conveyance disposition in the thin paper in H/H environment (an elevated temperature and high-humidity environment).

[0058] As mentioned above, in order to apply heat and a pressure to the record material S, in a fixing assembly, the moisture contained in the record material S is evaporated. The space in a fixing assembly

tends to be filled with the moisture which evaporated, and it especially tends to adhere to entrance slant face 11a of a nearby guide under delivery.

[0059] It is possible to stick with the moisture with which the tip of the record material S to which paper was delivered from the fixing nip A adhered to the steep incline, to buckle a tip, and to invite an accordion jam here, if the record material contact side of an entrance slant face is formed not at a rib but at the plane over a longitudinal direction.

[0060] On the other hand, in the guide 11 of the gestalt of this operation under delivery, curl amendment can be performed more smoothly, without making a record material S tip buckle, since entrance slant face 11a is formed with two or more ribs, since there is little free moisture and the sliding friction of the record material S and a guide rib also has it. [small]

[0061] As further effect in the gestalt of this operation, the offset prevention at the time of double-sided printing is mentioned. Namely, like the above-mentioned, with the anchorage device by the gestalt of this operation, as shown in drawing 3, tip curl of the record material S is corrected by making the entrance side of the guide 11 under delivery into a steep incline, and outlet side 11b of the guide 11 under delivery -- loose -- in addition -- and it formed in the shape of [smooth] a field. Therefore, it is avoidable for the inferior surface of tongue and guide side of the record material S to **** the record material S superfluously, since it was made for the guide side of the guide 11 under delivery to always serve as a lower part from the straight line to which the delivery roller speed V2 is larger than the fixing speed V1, and connects the fixing heater outlet B-delivery nip D after tip curl correction. Moreover, since gentle slope 11b of a bottom guide has the shape of a smooth field even if there are some ****, as compared with rib contact, contact pressure with the record material S can be decreased. That is, the fault which an image side rubs against a guide and can delete at the time of double-sided printing of the record material S is prevented.

[0062] When the concrete numeric value of the example by experiment was raised, the good result was able to be obtained under alpha= 7 degrees, beta= 60 degrees, gamma= 30 degrees, (beta-alpha =40-65 degree), gamma= 30 degrees, delta= 28 degrees, V1=75 mm/s, V2=79 mm/s, P1=10kgf, P2=800gf, and d= 6.5mm terms and conditions.

[0063] Setting curl-under tip of record material S after fixing nip orientation right in the steep incline of the upstream of the guide 11 under delivery according to the fixing assembly in the gestalt of this operation, as explained above, and it being based on cover printing which used delivery/fixing speed difference and the conveyance angular difference between delivery-fixing nips further, and exceeding, it can continue throughout the record material S and correction of bottom curl can be made possible.

[0064] Moreover, a guide-under delivery outlet side is formed in the shape of [loose and smooth] a field, the delivery roller speed V2 is larger than the fixing speed V1, and since it constituted from a straight line which connects the fixing heater outlet B-delivery nip D so that the guide side of the guide 11 under delivery might always serve as a lower part, offset by **** of a record material inferior surface of tongue and a guide side can be prevented.

[0065] (Gestalt of the 2nd operation) Drawing 5 and drawing 6 show the gestalt of operation of the 2nd of this invention.

[0066] Although drawing 5 and 6 explain the gestalt of operation of the 2nd of this invention, the same sign is given to the same element as the gestalt of the 1st operation, and the explanation is omitted.

[0067] Also in the gestalt of this operation, like the gestalt of the 1st operation, configuration condition [of a fixing assembly 116] ** - ** are the same, namely, have the straightening effect which was excellent to curl under the record material S.

[0068] There is orientation to suppress fixing temperature low from the standpoint of energy saving these days, and a fixable margin is decreasing. When applying the 1st configuration of the gestalt of operation to the fixing assembly to which such a fixable margin decreased, to take into consideration the case at the time of double-sided printing is desired.

[0069] That is, since the image of the 1st side at the tip of the record material S will be strongly ground to entrance slant face 11a of a bottom guide as shown in drawing 3, it is possible that the fixing image of the 1st side of the record material S is stripped off corresponding to two or more ribs in the case of the

delivery of the 2nd side. Moreover, when bad fixable conditions, such as a paper type and environment, lap, the toner which separated may carry out offset adhesion to the bottom guide 11. This offset toner grows gradually and also has a possibility of taking up a conveyance way finally and resulting in a jam. [0070] With the gestalt of this operation, as shown in drawing 5 and 6, the koro member 21 which is the lobe projected to the record material guide side is formed rotatable centering on the koro shaft 22 from the rib, and in order to cope with such faults, as shown in drawing 5, the koro member 21 is arranged so that only p may protrude highly rather than entrance slant face 11a of the bottom guide 11.

[0071] The koro member 21 and the koro shaft 22 are supported with a holder 23, and the holder 23 is inserted in U-bending of the back up plate 12. It is desirable to have the low friction nature which the koro member 21 makes the surface as smooth as possible, and rotates smoothly, surface nature is good, and Teflon (registered trademark) resin and ready-made ball bearings, such as PFA which is the thing which has a high mold-release characteristic, and to which a toner cannot adhere easily, and PTFE, are effective. In an experiment, the good result was obtained by $p=0.6\text{--}0.8\text{mm}$.

[0072] According to this configuration, the tip of the record material S is saved by the koro member 21, and contacting of it to two or more rib 11d slant face 11a formed in the entrance side of the bottom guide 11 strongly is lost, and it can avoid image peeling of the tip of the 1st side.

[0073] Moreover, by continuous running of a fixing assembly, since the temperature rise near a center is intense, the guide 11 under delivery tends to cause image peeling and toner offset. Therefore, with the gestalt of this operation, as shown in drawing 6, four koro members 21 are arranged near a bottom guide center.

[0074] The segment BD with which another feature in the gestalt of this operation connected the fixing heater outlet B-delivery nip D as shown in drawing 5 is more always than entrance slant face 11a of the koro member 21 and the guide 11 under delivery, and outlet slant face 11b the upper part.

[0075] That is, since the tip of the record material S turned up advances along with the guide 15 on delivery by entrance slant face 11a of the bottom guide 11, and the koro member 21, and it goes on, straining with a pin between fixing-delivery as mentioned above after reaching the delivery nip D, the printing side of the 1st side does not rub against a bottom guide.

[0076] Therefore, offer of the fixing assembly which can correct bottom curl is attained, without continuing throughout the record material S and generating **** of an image.

[0077] (Gestalt of the 3rd operation) Drawing 7 and drawing 8 show the gestalt of operation of the 3rd of this invention.

[0078] Although drawing 7 and 8 explain the gestalt of operation of the 3rd of this invention, the same sign is given to the 1st and the same element as the gestalt of operation of two, and the explanation is omitted.

[0079] Also in the gestalt of this operation, like the gestalt of the 1st and operation of two, configuration condition [of a fixing assembly 116] ** - ** are the same, namely, have the straightening effect which was excellent to curl under the record material S.

[0080] the gestalt of this operation shows to drawing 7 and 8 -- as -- entrance slant face 11a of the bottom guide 11 -- q -- it is high and the fixed rib 24 which is a lobe is arranged. As the quality of the material of a fixed rib 24, it is desirable to have low friction nature, surface nature is good, and Teflon (registered trademark) resin, such as PFA which is the thing which has a high mold-release characteristic, and to which a toner cannot adhere easily, and PTFE, is desirable. In an experiment, the good result was obtained by $q=0.5\text{--}0.9\text{mm}$. Moreover, the effect was demonstrated by arranging 4-6 fixed ribs 24 near the center of the bottom guide 11.

[0081] Moreover, as another feature, the segment BD which connected the fixing heater outlet B-delivery nip D is more always than entrance slant face 11a of a fixed rib 24 and the guide 11 under delivery, and outlet slant face 11b the upper part.

[0082] By this condition, by the reason same with having mentioned above, in order not to grind the record material S against the bottom guide 11, it does not cause faults, such as image peeling of the 1st side.

[0083] The effect of the gestalt of this operation is the same as the gestalt of the 2nd operation, and since

there are still few components mark, it has a cost merit.

[0084] In addition, this invention can apply not only the film fixing assembly shown in the gestalt of the above-mentioned 1st, the 2nd, and the 3rd operation but the conventional hot calender roll fixing assembly etc. to bottom curl correction in all fixing assemblies.

[0085] Moreover, this invention is not limited to the gestalt of each above-mentioned implementation at all, and all deformation is possible for it within the technical thought of this invention.

[0086]

[Effect of the Invention] Thus, according to this invention, it is reformable in curl-under record material tip after fixing nip orientation on the slant face of a guide-under delivery entrance side.

[0087] Moreover, according to this invention, since the slant face of a guide-under delivery outlet side is a gentle slope, conveyance of record material can be stabilized.

[0088] Moreover, according to this invention, curl-under record material tip after fixing nip orientation was set right on the slant face of a guide-under delivery entrance side, it continued throughout record material depending and exceeding to cover printing using conveyance angular difference further, and correction of bottom curl was enabled.

[0089] Moreover, according to this invention, curl-under record material tip after fixing nip orientation was set right on the slant face of a guide-under delivery entrance side, it continued throughout record material depending and exceeding to cover printing which used delivery/fixing speed difference and conveyance angular difference between delivery-fixing nips further, and correction of bottom curl was made possible.

[0090] Moreover, according to this invention, since the entrance slant face of said guide-under delivery section was formed with two or more ribs, correction of bottom curl of record material was made securable, securing the conveyance nature of the thin paper in a high-humidity/temperature environment.

[0091] Since the straight line which prepared the koro member or fixed rib which can rotate freely as a lobe, and connected fixing-delivery nip further furthermore considered as the upper part according to this invention from lobes, such as the bottom guide section and said koro member, or a fixed rib, so that it might project more slightly than the entrance slant face of the bottom guide section, offer of the bottom curl correction fixing assembly which prevented image peeling at the time of double-sided printing is attained.

[0092] Moreover, according to this invention, little good record material of curl can be offered, and improvement in discharge loading nature is achieved and the reliable image formation equipment which also reduces the trouble at the time of double-sided printing and an ADF manuscript can be offered.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Explanatory drawing of the fixing assembly concerning the gestalt of operation of the 1st of this invention.

[Drawing 2] The perspective diagram of the guide member of drawing 1.

[Drawing 3] (a) - (c) is explanatory drawing of record material curl correction of the fixing assembly of drawing 1.

[Drawing 4] The schematic diagram of the image formation equipment which can apply this invention.

[Drawing 5] The cross section of the fixing assembly concerning the gestalt of operation of the 2nd of this invention.

[Drawing 6] The perspective diagram of the guide member of drawing 5.

[Drawing 7] The cross section of the fixing assembly concerning the gestalt of operation of the 3rd of this invention.

[Drawing 8] The perspective diagram of the guide member of drawing 7.

[Drawing 9] (a) and (b) are drawing explaining whenever [tilt-angle / of a guide], and the amount relation of curl.

[Drawing 10] (a) - (c) is drawing showing curl generating of the record material by the anchorage device which will be the requisite for this invention.

[Drawing 11] The cross section of the conventional fixing assembly.

[Description of Notations]

A fixing nip

B Fixing heater outlet

C The production of a fixing nip tangent, and the intersection of a bottom guide entrance slant face

D delivery roller nip

S Record material

7 Pressurization Roller

11 Guide under Delivery

11a Entrance slant face

11d Outlet slant face

11c Notch

11d Rib

12 Back Up Plate

13 Delivery Roller

14 Delivery Koro

21 Koro Member

22 Koro Shaft

23 Holder

24 Fixed Rib

60 Heater Unit

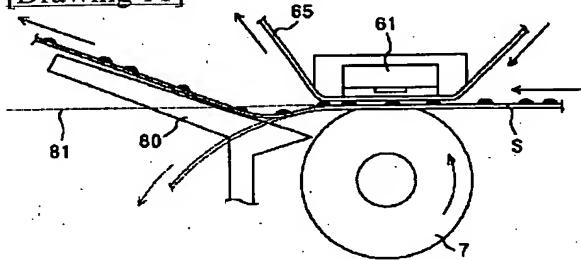
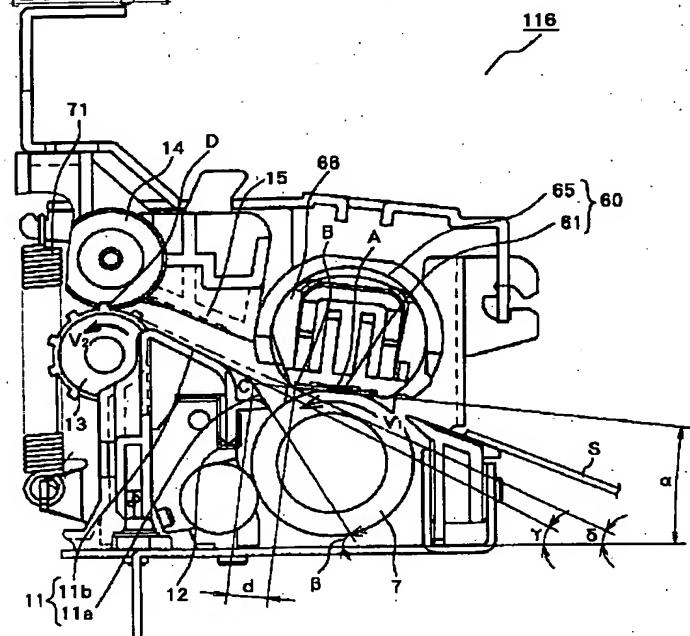
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65 Heat-resistant Film
116 Anchorage Device

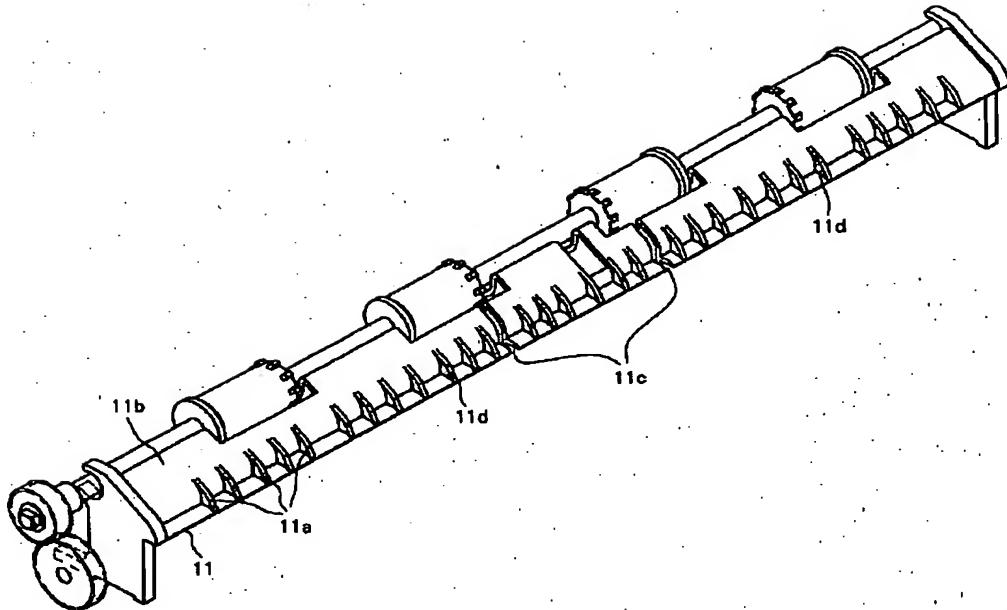
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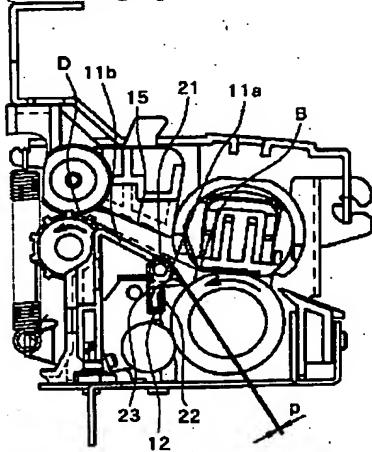
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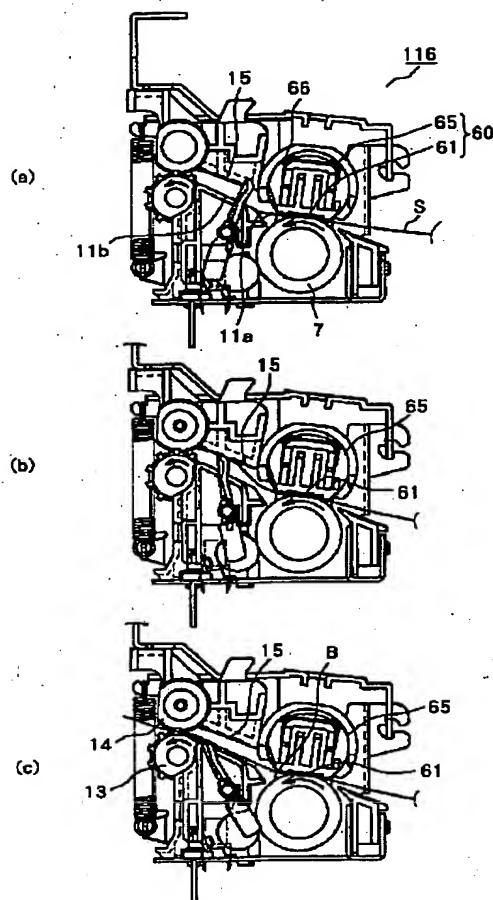
DRAWINGS**[Drawing 11]****[Drawing 1]****[Drawing 2]**



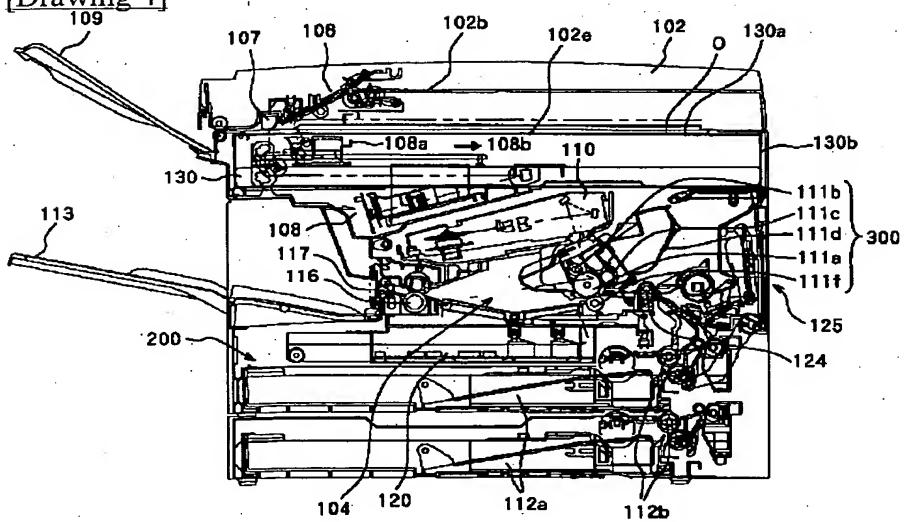
[Drawing 5]



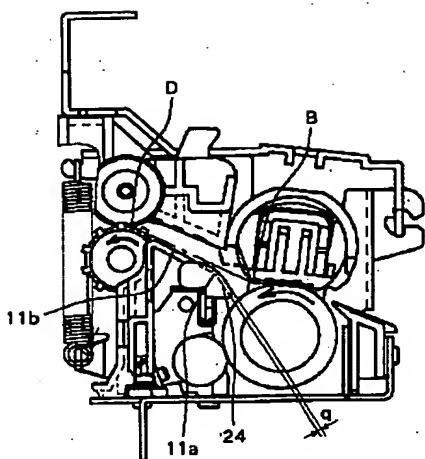
[Drawing 3]



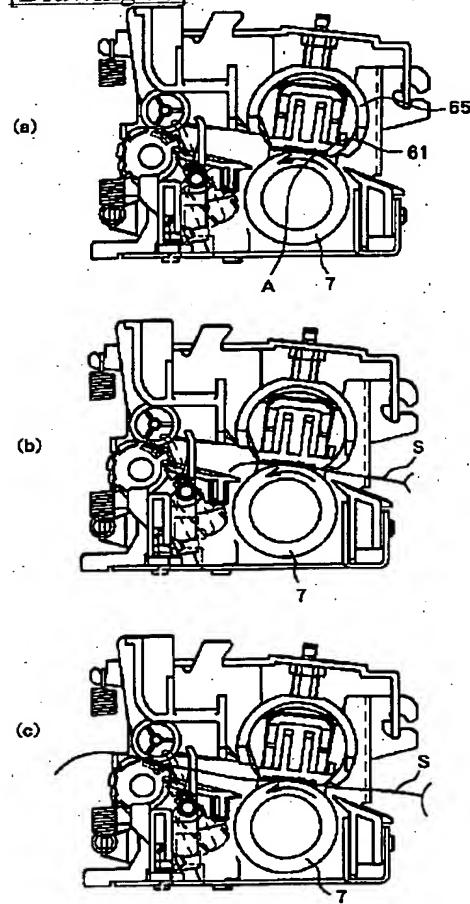
[Drawing 4]



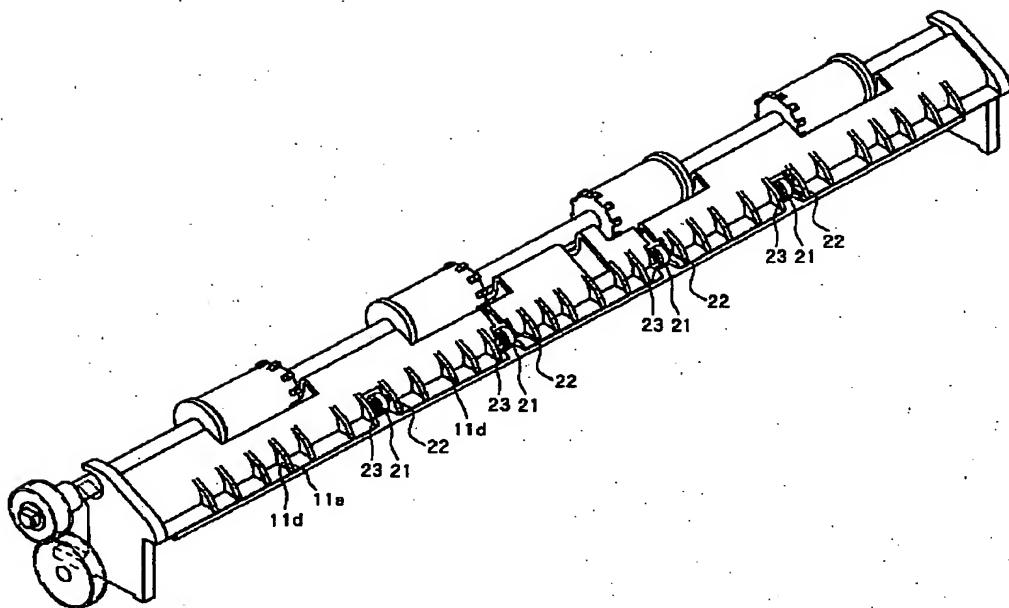
[Drawing 7]



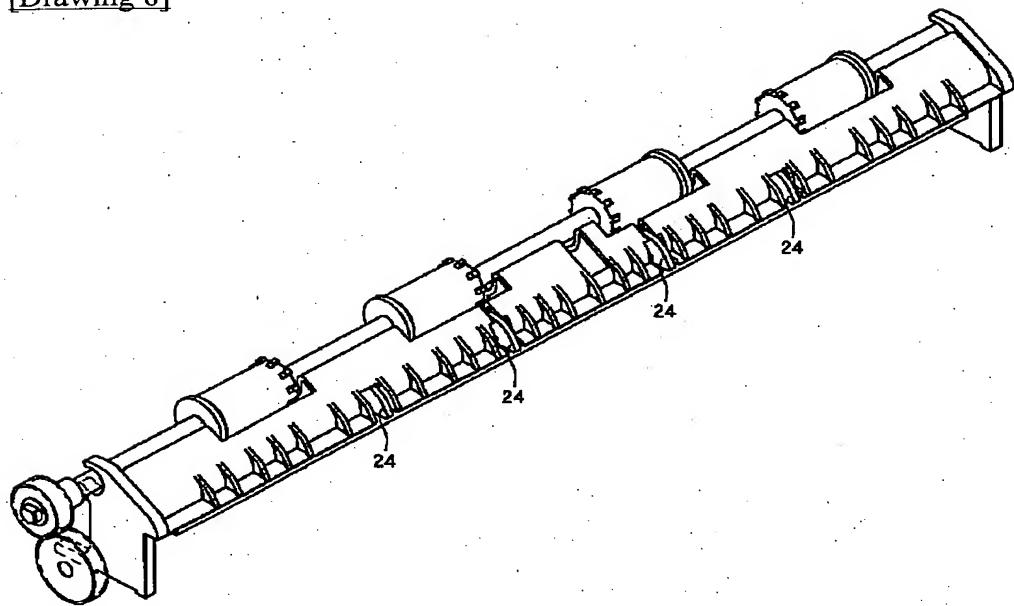
[Drawing 10]



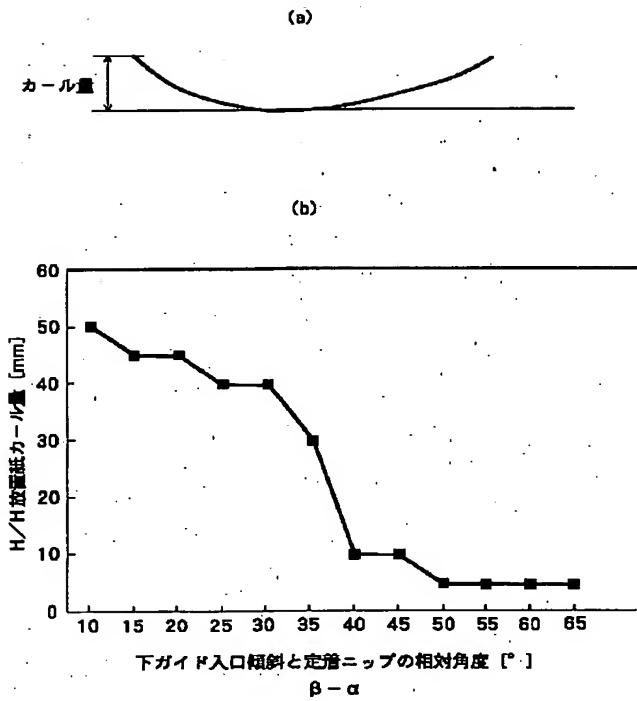
[Drawing 6]



[Drawing 8]



[Drawing 9]



[Translation done.]

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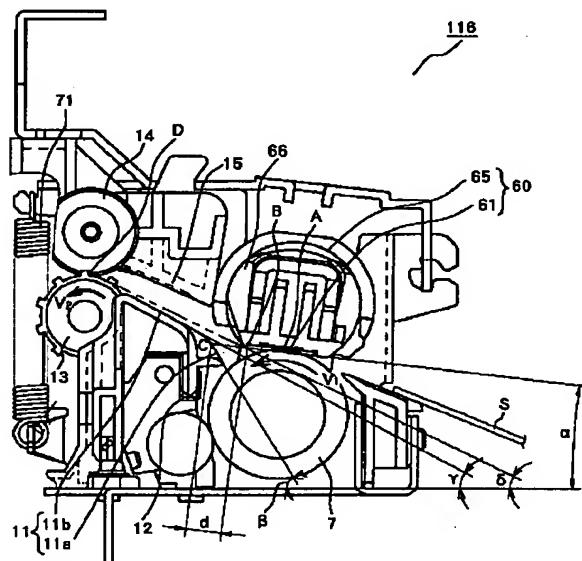
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(54)【発明の名称】 定着装置および画像形成装置

(57)【要約】

【課題】記録材の下カールの発生をより一層低減する定着装置を提供するものである。

【解決手段】定着ニップAと排紙ローラ対13、14との間の下部ガイド11を、定着ニップAを通ローラニップ搬送路延長線上で、定着ニップAの排出側近傍に設けられた記録材の先端が当接する入口側ガイド部11aと、入口側ガイド部11aに連なる出口側ガイド部11bとで構成し、入口側ガイド部11aを出口側ガイド部11bよりも急斜面に形成し、定着ニップAを通過する記録材の搬送路の傾斜角よりも、定着ニップAの排紙端と前記排紙ローラ対のニップとを結んだ直線の傾斜角を大きくし、定着ニップの記録材搬送速度よりも排紙ローラ対13、14による記録材の搬送速度を大きくした。



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【特許請求の範囲】

【請求項1】 挟圧部に未定着トナー像を担持した記録材を通過させることにより前記トナー像を前記記録材に加熱定着させる挟圧加熱搬送手段と、前記挟圧部を通過した記録材を排紙ローラ対に向けて案内する下部ガイドとを有する定着装置において、
前記下部ガイドは、前記挟圧部の排紙側に対向配置され、前記挟圧部を通過する記録材の搬送路延長線上で、前記挟圧部の排出側近傍に設けられた記録材の先端が当接する入口側ガイド部と、前記入口側ガイド部に連なる10出口側ガイド部を有し、前記入口側ガイド部を前記出口側ガイド部よりも急斜面に形成したことを特徴とする定着装置。

【請求項2】 挟圧部に未定着トナー像を担持した記録材を通過させることにより前記トナー像を前記記録材に加熱定着させる挟圧加熱搬送手段と、前記挟圧部を通過した記録材を排紙ローラ対に向けて案内する下部ガイドとを有する定着装置において、

前記下部ガイドは、前記挟圧部の排紙側に対向配置され、前記挟圧部を通過する記録材の搬送路延長線上で、前記挟圧部の排出側近傍に設けられた記録材の先端が当接する入口側ガイド部と、前記入口側ガイド部に連なる出口側ガイド部を有し、前記入口側ガイド部を前記出口側ガイド部よりも急斜面に形成し、前記挟圧部を通過する記録材の搬送路の傾斜角よりも、前記挟圧部の排紙端と前記排紙ローラ対のニップとを結んだ直線の傾斜角を大きくしたことを特徴とする定着装置。

【請求項3】 挟圧部に未定着トナー像を担持した記録材を通過させることにより前記トナー像を前記記録材に加熱定着させる挟圧加熱搬送手段と、前記挟圧部を通過した記録材を排紙ローラ対に向けて案内する下部ガイドとを有する定着装置において、

前記下部ガイドは、前記挟圧部の排紙側に対向配置され、前記挟圧部を通過する記録材の搬送路延長線上で、前記挟圧部の排出側近傍に設けられた記録材の先端が当接する入口側ガイド部と、前記入口側ガイド部に連なる出口側ガイド部を有し、前記入口側ガイド部を前記出口側ガイド部よりも急斜面に形成し、前記挟圧部を通過する記録材の搬送路の傾斜角よりも、前記挟圧部の排紙端と前記排紙ローラ対のニップとを結んだ直線の傾斜角を大きくし、前記挟圧加熱搬送手段の記録材搬送速度よりも前記排紙ローラ対による記録材の搬送速度を大きくしたことを特徴とする定着装置。

【請求項4】 前記挟圧加熱搬送手段は、支持体に固定的に支持された加熱体と、前記加熱体に対向圧接しつつ搬送される耐熱性フィルムと、前記耐熱性フィルムを介して記録材を前記加熱体に密着させる加圧部材とを有することを特徴とする請求項1、2または3記載の定着装置。

【請求項5】 前記下部ガイドは、記録材の搬送方向に50

沿って延び、記録材のガイド面を提供するリブを記録材の搬送方向と直交する方向に複数設けたことを特徴とする請求項1、2、3または4記載の定着装置。

【請求項6】 前記複数のリブは、前記下部ガイドの入口側ガイド部に設けたことを特徴とする請求項5記載の定着装置。

【請求項7】 前記下部ガイドには、前記リブよりも若干突出した突出部材を前記複数のリブの間に設けたことを特徴とする請求項5または6記載の定着装置。

【請求項8】 前記挟圧部の排紙端と前記排紙ローラ対のニップとを結んだ直線を前記下部ガイドのガイド面よりも上方としたことを特徴とする請求項1、2、3または4記載の定着装置。

【請求項9】 前記挟圧部の排紙端と前記排紙ローラ対のニップとを結んだ直線を前記下部ガイドの突出部材よりも上方としたことを特徴とする請求項5、6、または7記載の定着装置。

【請求項10】 前記突出部材は、表面が低摩擦性を有していることを特徴とする請求項7または9記載の定着装置。

【請求項11】 前記突出部材は、記録材の搬送方向に沿って回転自在に支持された回転体であることを特徴とする請求項7または9記載の定着装置。

【請求項12】 前記突出部材は、回転自在に支持されたボールベアリングであることを特徴とする請求項11記載の定着装置。

【請求項13】 前記下部ガイドの入口側ガイド部を複数のリブ形状に形成すると共に、出口側ガイド部を面状にて形成したことを特徴とする請求項1ないし3のいずれか一つに記載の定着装置。

【請求項14】 前記下部ガイドの入口側ガイド面の傾斜角と前記挟圧部の相対角度が40°以上65°以下であることを特徴とする請求項1ないし3のいずれか一つに記載の定着装置。

【請求項15】 請求項1ないし14のいずれか一つに記載の定着装置を有することを特徴とする画像形成装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、記録材上に形成されたトナー像を加熱定着する定着装置、および該定着装置を有する電子写真装置、静電記録装置等の画像形成装置に関するものである。

【0002】

【従来の技術】従来、記録材上に担持した画像を加熱溶融して該記録材に定着する画像加熱定着装置としては、所定の温度に維持された加熱ローラと、弹性層を有して該加熱ローラに圧接する加圧ローラを有し、該両ローラによって、未定着のトナー画像が形成された記録材を挟持搬送しつつ加熱する熱ローラ定着方式が多用されてい

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る。

【0003】しかしこの熱ローラ定着方式は、第1に所定温度に立ち上げるまで画像形成動作を禁止する時間、いわゆるウエイトタイムがかなり長く必要であり、第2に熱容量が必要なため比較的大きな電力が必要であり、第3に回転ローラでローラ温度が高温のため耐熱特殊軸受けが必要であり、第4にローラに直接手が触れる構成となり危険があるため保護部材が必要であり、第5にローラ定着温度及び曲率により記録部材がローラに巻き付いてジャム発生原因となる、などの欠点があった。

【0004】そこで、本出願人が提案したフィルム加熱方式の定着方式は、上記の熱ローラ定着方式やその他に知られるベルト駆動方式、フラッシュ定着方式、オープン定着方式等の熱定着装置との対比において、低熱容量線状加熱体を用いることができるため、省電力化（クイックスタート性）になり、定着点と分離点が別々に設定できるためオフセットが防止され、その他、他の方式装置の種々の欠点を解決できるなどの利点を有し効果的なものである。

【0005】本出願人の先の提案に係る例え特開昭63-313182号公報に開示の方式・装置等がこれに属し、薄肉の耐熱フィルム（シート）と、このフィルムの移動駆動手段と、該フィルムを挟んで一方側に固定支持して配置された加熱体と、他方面側にこの加熱体に対向して配置され、該加熱体に対して該フィルムを介して画像定着すべき記録材の顕画像担持面を密着させる加圧部材等を有している。

【0006】前記フィルムは、少なくとも画像定着実行時はフィルムと加圧部材との間に搬送導入される画像定着すべき記録材と順方向に同一速度で走行移動し、記録材は走行移動フィルムを挟んで加熱体と加圧部材との圧接で形成される定着ニップ部を通過することにより記録材の顕画像担持面がフィルムを介して加熱体で加熱され顕画像に熱エネルギーが付与され軟化、溶融される。

【0007】次いでフィルムと記録材を離間、或は、トナーが冷却、固化した後にフィルムと記録材を離間させることが行われる。

【0008】このようなフィルム加熱方式の定着装置では、記録材の移動通過方向と交差する方向を長手とする通電発熱層が設けられており、この通電発熱層の長手両端子部の通電用電極間に電圧が印加されることで発熱層の有効全長域の各部が単位長さ当たりの発熱量をもって発熱する。この発熱層の有効全長域は、定着装置を組込んだ画像形成装置に供給して使用できる最大サイズの記録材の幅（最大幅、最大サイズ幅）に対応した長さを有している。

【0009】定着実行時には、使用記録材のサイズ幅の大小にかかわりなく発熱層の有効全長域が単位長さ当たりの所定の発熱量をもって通電発熱する。

【0010】

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【発明が解決しようとする課題】しかしながら、上記従来例のようなフィルム加熱方式の定着装置には次のような問題を招くことが考えられる。

【0011】図10は従来のフィルム加熱方式の定着装置を示す。

【0012】図10の(a)に示すように、円筒状の定着フィルム65を挟んで略フラット形状の加熱体61と、ロール形状の加圧部材7との圧接によって定着ニップ部Aが形成され、図10の(b)に示すように、この定着ニップ部Aを通過する記録材Sは加圧部材7側にクセがつきやすい。すなわち、下カール状態（上向きに凸状態）で排出しやすくなる。特に、記録材の先端では、このカールがつきやすい。

【0013】また、低熱容量の加熱体61を用いて瞬間にフィルム65を介して記録材Sに熱エネルギーを与えて画像を定着させるため、図10の(c)に示すように、特に装置起動直後は加圧部材7との温度差が大きく、記録材Sの下カール傾向が著しく大きくなり、場合によっては記録材Sにシワを生じることもあった。

【0014】また記録材Sにカールやシワが発生するということは、該排出記録材の品位を損ねるのみならず、排出後の記録材の積載性能の低下や、両面、ADFでの給紙時のトラブルにもつながり、装置自体の信頼性悪化を招いていた。

【0015】そこで、本出願人は、図11に示すように、ニップ出口側のガイド80をニップの延長ライン81の下方から上方に向かって立ち上げることにより、記録材のカールを防止することを提案している。

【0016】しかしながら、このガイドの傾斜は比較的緩やかなものであり、記録材に生じた比較的大きなカール、特に記録材の先端に生じた大きなカールの矯正には十分なものではなかった。

【0017】本出願に係る発明の目的は、記録材のカールの発生をより一層低減する定着装置および画像形成装置を提供しようとするものである。

【0018】

【課題を解決するための手段】本出願に係る発明の目的を実現する定着装置の第1の構成は、挟圧部に未定着トナー像を担持した記録材を通過させることにより前記トナー像を前記記録材に加熱定着させる挟圧加熱搬送手段と、前記挟圧部を通過した記録材を排紙ローラ対に向けて案内する下部ガイドとを有する定着装置において、前記下部ガイドは、前記挟圧部の排紙側に対向配置され、前記挟圧部を通過する記録材の搬送路延長線上で、前記挟圧部の排出側近傍に設けられた記録材の先端が当接する入口側ガイド部と、前記入口側ガイド部に連なる出口側ガイド部を有し、前記入口側ガイド部を前記出口側ガイド部よりも急斜面に形成したものである。

【0019】本出願に係る発明の目的を実現する定着装置の第2の構成は、挟圧部に未定着トナー像を担持した

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記録材を通過させることにより前記トナー像を前記記録材に加熱定着させる挾圧加熱搬送手段と、前記挾圧部を通過した記録材を排紙ローラ対に向けて案内する下部ガイドとを有する定着装置において、前記下部ガイドは、前記挾圧部の排紙側に対向配置され、前記挾圧部を通過する記録材の搬送路延長線上で、前記挾圧部の排出側近傍に設けられた記録材の先端が当接する入口側ガイド部と、前記入口側ガイド部に連なる出口側ガイド部を有し、前記入口側ガイド部を前記出口側ガイド部よりも急斜面に形成し、前記挾圧部を通過する記録材の搬送路の傾斜角よりも、前記挾圧部の排紙端と前記排紙ローラ対のニップとを結んだ直線の傾斜角を大きくしたものである。

【0020】本出願に係る発明の目的を実現する定着装置の第3の構成は、挾圧部に未定着トナー像を担持した記録材を通過させることにより前記トナー像を前記記録材に加熱定着させる挾圧加熱搬送手段と、前記挾圧部を通過した記録材を排紙ローラ対に向けて案内する下部ガイドとを有する定着装置において、前記下部ガイドは、前記挾圧部の排紙側に対向配置され、前記挾圧部を通過する記録材の搬送路延長線上で、前記挾圧部の排出側近傍に設けられた記録材の先端が当接する入口側ガイド部と、前記入口側ガイド部に連なる出口側ガイド部を有し、前記入口側ガイド部を前記出口側ガイド部よりも急斜面に形成し、前記挾圧部を通過する記録材の搬送路の傾斜角よりも、前記挾圧部の排紙端と前記排紙ローラ対のニップとを結んだ直線の傾斜角を大きくし、前記挾圧加熱搬送手段の記録材搬送速度よりも前記排紙ローラ対による記録材の搬送速度を大きくしたものである。

【0021】本出願に係る発明の目的を実現する定着装置の第4の構成は、上記いずれかの構成で、前記挾圧加熱搬送手段は、支持体に固定的に支持された加熱体と、前記加熱体に対向圧接しつつ搬送される耐熱性フィルムと、前記耐熱性フィルムを介して記録材を前記加熱体に密着させる加圧部材とを有するものである。

【0022】本出願に係る発明の目的を実現する定着装置の第5の構成は、上記いずれかの構成で、前記下部ガイドは、記録材の搬送方向に沿って延び、記録材のガイド面を提供するリブを記録材の搬送方向と直交する方向に複数設けたものである。

【0023】本出願に係る発明の目的を実現する定着装置の第6の構成は、上記した第5の構成で、前記複数のリブは、前記下部ガイドの入口側ガイド部に設けたものである。

【0024】本出願に係る発明の目的を実現する定着装置の第7の構成は、上記第5または第6の構成で、前記下部ガイドには、前記リブよりも若干突出した突出部材を前記複数のリブの間に設けたものである。

【0025】本出願に係る発明の目的を実現する定着装置の第8の構成は、上記第1、2、3または4の構成

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で、前記挾圧部の排紙端と前記排紙ローラ対のニップとを結んだ直線を前記下部ガイドのガイド面よりも上方としたものである。

【0026】本出願に係る発明の目的を実現する定着装置の第9の構成は、上記第5、6または7の構成で、前記挾圧部の排紙端と前記排紙ローラ対のニップとを結んだ直線を前記下部ガイドの突出部材よりも上方としたものである。

【0027】本出願に係る発明の目的を実現する定着装置の第10の構成は、上記第7または9の構成で、前記突出部材は、表面が低摩擦性を有しているものである。

【0028】本出願に係る発明の目的を実現する定着装置の第11の構成は、上記第7または9の構成で、前記突出部材は、記録材の搬送方向に沿って回転自在に支持された回転体とするものである。

【0029】本出願に係る発明の目的を実現する定着装置の第12の構成は、上記第11の構成で、前記突出部材は、回転自在に支持されたボールベアリングとするものである。

【0030】本出願に係る発明の目的を実現する定着装置の第13の構成は、上記第1ないし第3のいずれかの構成で、前記下部ガイドの入口側ガイド部を複数のリブ形状に形成すると共に、出口側ガイド部を面状にて形成したものである。

【0031】本出願に係る発明の目的を実現する定着装置の第14の構成は、上記第1ないし第3のいずれかの構成で、前記下部ガイドの入口側ガイド面の傾斜角と前記挾圧部の相対角度が40°以上65°以下としたものである。

【0032】本出願に係る発明の目的を実現する画像形成装置の構成は、上記いずれかの構成の定着装置を有するものである。

【0033】

【発明の実施の形態】以下、図面を参照して本発明の実施の形態を詳細に説明する。

【0034】(第1の実施の形態) 図1～図4は本発明の第1の実施の形態を示す。

【0035】図4は本発明の実施の形態におけるデジタル複写機を表す主要断面図である。同図において、130はフラットベッドスキャナであり、原稿台ガラス130a上に置かれた原稿Oを走査手段108aが矢印108b方向に移動することで読み取る。102は圧板で、使用者が自在に上下に開閉することができ、原稿台ガラス130a上に置かれた原稿Oを押さえるものである。108は画像を読み取るCCDイメージセンサである。102eはスキャナの上板、130bはスキャナの側板である。

【0036】原稿は次の方法でも読み取り可能である。圧板102の上面には、原稿Oを複数枚積載することができるよう構成された原稿台102bが設けられてい

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る。106は原稿Oを一枚ずつ分離しつつ搬送を行う原稿搬送部であり、シート読取部107に原稿を搬送させながら原稿を読み取る。ここで、原稿搬送部106は圧板102の一部に設けられており、圧板102の開閉と共に上下動する。109は排出された原稿を積載する原稿排紙トレイである。

【0037】104はレーザビームプリンタから成る記録装置部、200はカセット給紙部、125は手差し給紙部、300は画像形成部、116は定着装置、117は排紙ローラ対、113は排出された記録材を積載する記録材排紙トレイである。
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【0038】記録装置部104は、装置下部に配置される。汎用サイズの記録材Sが積層収容されたカセット112a内の記録材Sを給送ローラ112bにより一枚ずつ分離し、レジストローラ対124により記録材Sの斜行を補正し、制御部120からのプリント信号と同期させ記録材Sを画像形成部300へ給送する。

【0039】そして、帯電部材111bにより静電潜像担持体たる感光ドラム111aの表面を一様に帯電させ、この表面をレーザスキャナ110により画像情報に基づいて露光される。
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【0040】これにより、感光ドラム111a上に静電潜像が形成され、前記画像形成部の現像剤としてのトナーを現像剤担持体たる現像スリープ111cにより感光ドラム111a上の静電潜像に転移させ、感光ドラム111a上にトナー像が形成される。

【0041】そして、感光ドラム111aに担持された前記トナー像が転写ローラ111fにより記録材Sに転写され、さらにトナー像を担持した前記記録材Sは定着装置116へ搬送される。111dは感光ドラム111a、帯電部材111b、現像スリープ111c等を収容するカートリッジの枠体である。
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【0042】定着装置116は、図1に示すように、ヒータユニット60と加圧ローラ7を備えている。そして、この定着装置116にて上記トナー像は記録材S上に定着され、排紙トレイ113上へ排出する。

【0043】ここで、本実施の形態における定着装置116は図1に示すようなフィルム加熱定着装置であり、以下に詳細を説明する。

【0044】図1において、60はヒータユニットで、65は円筒形状の耐熱性フィルムであり、基層に厚さ40~60μmのポリイミドフィルムを用い、その外周面（記録材及びトナー像と接触する面）に厚さ5~20μmのPFA及びPFA中にPTFEを分散させた離型層が形成されたフィルムである。
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【0045】61は加熱体としてのヒータであり、このヒータ61は、記録材Sの搬送方向に直交する方向を長手とする絶縁性、耐熱性、低熱容量のセラミック基板と、その表面に長手に沿って印刷された抵抗発熱体と、上記セラミック基板の抵抗発熱体の形成面とは反対側に
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接触させて設けた温度検知素子としてのサーミスターを基本構成とするものである。

【0046】一方、加圧部材としての加圧ローラ7は、ヒータ61に対して長手方向両端部に設けられた加圧バネ71により圧力P1で加圧されており、加圧ローラ7は記録材Sの搬送方向に、駆動系（図示せず）により回転駆動（反時計回り）される。これにより、円筒形の耐熱性フィルム65がヒータ61の発熱体表面に密着摺動して、フィルムガイド66の周囲を回転する。また、この時、ヒータのフィルム内面の摺動摩擦を軽減するために、両者の間に耐熱性のグリスを介在させている。

【0047】以上の構成により、フィルム65と加圧ローラ7との間に記録材Sが案内され、定着ニップ部を通過することで、記録材S上のトナー像は定着される。定着後の記録材Sは、排紙ローラ13、および排紙ローラに不図示の付勢手段により付勢された排紙コロ14により挟持搬送され、排紙される。

【0048】ここで図1により、本実施の形態に係る定着装置116について詳細に説明する。

【0049】まず、本実施の形態における定着器の要部を説明する。定着ニップをA、定着ニップAの延長上の定着手段端部である定着ヒータ出口をB、定着ニップ接線の延長線と下ガイド入口斜面の交点をC、排紙ローラニップをDとする。ここで、排紙ガイドの下部ガイドとしての排紙下ガイド11は、記録材移動方向に関してガイド面上流側の第1ガイド部である入口斜面11aと下流側の第2ガイド部である出口斜面11bを有し、その間を滑らかに円弧で繋ぐよう形成される。また、水平線に対する定着ニップ角を α 、排紙下ガイド入口角を β 、排紙下ガイド出口角を γ 、および定着一排紙角（線分BDの角度）を δ とすると、

$$\alpha < \beta \quad ①$$

$$\gamma < \beta \quad ②$$

$$\alpha < \delta \quad ③$$

また加圧ローラ（定着フィルム）速度V1、排紙ローラ速度V2とすると、

$$V1 < V2 \quad ④$$

であり、定着圧接力P1、排紙ローラ圧接力P2とすると、

$$P1 > P2 \quad ⑤$$

に設定されている。

【0050】次に定着器内の動作を説明する。前述の如くエンジン側で未定着画像を記録された記録材Sは、まず定着ニップAにて熱と圧力を付与され定着されて、永久画像を得る。その後記録材S先端は下カール傾向で進んでいく。ところが上記 $\alpha < \beta$ および、下ガイド入口斜面11aが定着ニップ接線の延長線とCにて交差するよう設けられており、さらには定着ヒータ出口Bと上記Cとの距離dが近接して配設されている。そのため、記録材Sの先端はC近傍にて熱い状態で当接することとな

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り、図3(a)のように、進行方向を上向きに変え、すなわち記録材Sの先端側の下カールが矯正される。その後、記録材Sの先端は図3(b)に示すように跳ね上がるようにして、排紙上ガイド15に沿って進行していく。

【0051】さらに進んで図3(c)に示すように、記録材Sが定着ニップA、排紙ローラニップDの双方に渡っている時には、上記④、⑤の関係より、記録材Sの速度は加圧ローラ速度V1に支配され、すなわち排紙ローラ13、14対間で記録材は滑っている状態となる。このとき、記録材Sは定着ヒータ出口B—排紙ニップD間でピンと張りきることになり、またヒータ出口Bにてしごくように引抜かれる。そのため記録材Sはその通紙方向全域に亘って上向きローラニップなされ、すなわち下カールが矯正されることになる。

【0052】ここで下ガイド入口傾斜角度によるカール量改善の関係について説明する。カール量は最も条件の厳しいH/H環境(高温・高湿環境)における放置紙の排出直後のma×データで比較を行った。図9(a)

(b)に下ガイド入口傾斜と定着ニップの相対角度($\beta - \alpha$)と記録材Sのカール量の関係を示す。この図より明らかなように下ガイド入口傾斜と定着ニップの相対角度($\beta - \alpha$)は40°以上65°以下が望ましいことがわかる。35°以下ではカール量改善の効果が不十分であり、反対に70°を越えると記録材先端の抵抗が大きくなつてジャムの発生が生じた。

【0053】このように本実施の形態では排紙下ガイド11の入口斜面11aの傾斜度が比較的大きくなっているので、この部分で比較的大きな記録材のカール(特に記録材先端のカール)を矯正することができ、またその入口斜面11aに続く出口斜面11bの傾斜度は比較的小さくなっているので、排紙下ガイド全体が急斜面になつている場合に比べ、記録材の搬送負荷を軽減することができ、記録材を安定して搬送することができる。

【0054】なお、本実施の形態では、図2に示すように、排紙下ガイド11の入口斜面11aに複数のリブ11dを長手方向に複数形成し、このリブ11dを記録材Sとの当接面とした。

【0055】本実施の形態において、排紙下ガイド11の材質としては、成形樹脂が望ましく、100~150°Cでの連続使用に耐え得るP.B.TやP.E.Tが最適である。

【0056】なお、下ガイド11の材質をこれらの樹脂にする場合は、熱膨張によるガイドの変形を考慮して、図2に示したように、樹脂ガイドには長手方向に切欠き11cを複数設け、熱膨張による変形を自在に許容し得るようにし、また、図1に示すように、U曲げ形成されたSUS板のような熱膨張しにくい補強板12を樹脂製の排紙下ガイド11に一体化させるよう配設し、これにより剛性、および所定の形状を得るように構成してい

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る。

【0057】また、本実施の形態における定着器では、H/H環境(高温・高湿環境)での薄紙での搬送性向上に威力を發揮する。

【0058】前述したように、定着器では記録材Sに熱と圧力を加えるために、記録材Sに含まれる水分を蒸発させる。蒸発した水分は定着器内の空間にこもりやすく、とりわけ近傍の排紙下ガイドの入口斜面11aに付着しやすい。

【0059】ここで、入口斜面の記録材当接面をリブではなく、長手方向に渡る平面にて形成していると、定着ニップAから排紙された記録材Sの先端が急斜面に付着した水分により貼り付く場合があり、先端が座屈してアコードオンジャムを招くことが考えられる。

【0060】これに対し、本実施の形態の排紙下ガイド11では、入口斜面11aを複数のリブにて形成しているために付着水分が少なく、また記録材Sとガイドリブとの摺動抵抗も小さいため、記録材S先端を座屈させることなく、カール補正をよりスムーズに行うことができる。

【0061】本実施の形態におけるさらなる効果として、両面印字時のオフセット防止が挙げられる。すなわち前述のごとく、本実施の形態による定着装置では、図3に示したように排紙下ガイド11の入口側を急斜面として、記録材Sの先端カールの矯正を行う。そして排紙下ガイド11の出口側11bを緩やかでなおかつ滑らかな面状に形成した。したがって記録材Sは先端カール矯正後は、排紙ローラ速度V2が定着速度V1より大きく、また定着ヒータ出口B—排紙ニップDを結ぶ直線よりも、排紙下ガイド11のガイド面が常に下方となるようにしたので、不必要に記録材Sの下面とガイド面とが摺擦することを回避可能である。また多少の摺擦があつても、下ガイドの緩斜面11bが滑らかな面状であるため、リブ当接と比較して、記録材Sとの接触圧を減少させることができる。すなわち記録材Sの両面印字時に画像面がガイドに擦れて削れる不具合を防止している。

【0062】実験による実施例の具体的な数値を上げると、

$$\alpha = 7^\circ, \beta = 60^\circ, \gamma = 30^\circ, (\beta - \alpha = 40 \sim 65^\circ),$$

$$\gamma = 30^\circ, \delta = 28^\circ,$$

$$V1 = 75 \text{ mm/s}, V2 = 79 \text{ mm/s},$$

P1 = 10 kgf, P2 = 800 g f, d = 6.5 mm の諸条件にて良好な結果を得られた。

【0063】以上説明したように本実施の形態における定着器によれば、定着ニップ後の記録材Sの先端の下カール傾向を排紙下ガイド11の上流側の急斜面にて矯正を行い、さらに排紙一定着ニップ間での排紙/定着速度差および搬送角度差を利用したしごきによるこし付けにより、記録材Sの全域に亘り下カールの矯正を可能にす

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することができる。

【0064】また、排紙下ガイド出口側を緩やかかつ滑らかな面状に形成し、排紙ローラ速度V2が定着速度V1より大きく、また定着ヒータ出口B-排紙ニップDを結ぶ直線よりも、排紙下ガイド11のガイド面が常に下方となるように構成したので、記録材下面とガイド面との摩擦によるオフセットを防止することができる。

【0065】(第2の実施の形態)図5および図6は本発明の第2の実施の形態を示す。

【0066】本発明の第2の実施の形態を図5、6により説明するが、第1実施の形態と同じ要素には同一符号を付しその説明を省略する。10

【0067】本実施の形態においても、第1実施の形態と同様に、定着器116の構成条件①～⑤は同様であり、すなわち記録材Sの下カールに対して優れた矯正効果を有する。

【0068】昨今省エネの見地から定着温度を低く抑える傾向があり、定着性のマージンが減少傾向にある。このような定着性のマージンが減少された定着器に対し、第1の実施の形態の構成を適用する場合、両面印字時の20場合を考慮することが望まれる。

【0069】すなわち、図3に示したように、記録材Sの先端の1面目の画像が下ガイドの入口斜面11aに強く擦られてしまうので、2面目の排紙の際に、複数のリブに対応して記録材Sの1面目の定着画像が剥ぎ取られることが考えられる。また紙種や環境等定着性の悪い条件が重なると、剥がれたトナーが下ガイド11へオフセット付着することがある。このオフセットトナーは次第に成長していく、最終的には搬送路を塞いでジャムに至るおそれもある。

【0070】本実施の形態では、これらの不具合に対処するため、図5、6に示したように、リブより記録材ガイド側に突出した突出部であるコロ部材21をコロ軸22を中心に回動可能に設けており、図5に示すように、コロ部材21を下ガイド11の入口斜面11aよりもpだけ高く出っ張るように配置している。

【0071】コロ部材21、コロ軸22はホルダ23にて支持され、ホルダ23は補強板12のU曲げ内にはめ込まれている。コロ部材21は表面をできるだけ平滑とし、また円滑に回転する低摩擦性を有することが望ましく、表面性が良く、離型性が高い、トナーが付着しにくいものであるPFAやPTFE等のテフロン(登録商標)樹脂が望ましい。実験ではp=0.6~0.8mmで良好な結果が得られた。

【0072】この構成によれば、記録材Sの先端はコロ部材21によってすぐわれ、下ガイド11の入口側に形成された複数のリブ11dの斜面11aに強く当接することなくなり、1面目の先端の画像剥がれを回避することができる。

【0073】また、排紙下ガイド11は定着器の連続運50

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転により、中央付近の温度上昇が激しいため、画像剥がれやトナーオフセットを起こし易い。したがって、本実施の形態では、図6に示すように、コロ部材21を下ガイド中央付近に4ヶ配設している。

【0074】本実施の形態におけるもう一つの特徴は、図5に示したように、定着ヒータ出口B-排紙ニップDを結んだ線分BDがコロ部材21および排紙下ガイド11の入口斜面11a、出口斜面11bよりも常に上方である。

【0075】すなわち、下ガイド11の入口斜面11aとコロ部材21で上方に向けられた記録材Sの先端は排紙上ガイド15に沿って進行し、排紙ニップDに到達後は前述のように定着一排紙間でピンと張りつめながら進行するので、1面目の印字面が下ガイドに擦れることがない。

【0076】したがって、記録材Sの全域に亘り画像の削れを発生することなく、下カールを矯正可能な定着器の提供が可能となる。

【0077】(第3の実施の形態)図7および図8は本発明の第3の実施の形態を示す。

【0078】本発明の第3の実施の形態を図7、8により説明するが、第1、2の実施の形態と同じ要素には同一符号を付しその説明を省略する。

【0079】本実施の形態においても、第1、2の実施の形態と同様に、定着器116の構成条件①～⑤は同様であり、すなわち記録材Sの下カールに対して優れた矯正効果を有する。

【0080】本実施の形態では、図7、8に示すように、下ガイド11の入口斜面11aよりもq高く、突出部である固定リブ24を配設している。固定リブ24の材質としては、低摩擦性を有することが好ましく、表面性が良く、離型性が高い、トナーが付着しにくいものであるPFAやPTFE等のテフロン(登録商標)樹脂が望ましい。実験ではq=0.5~0.9mmで良好な結果を得た。また、固定リブ24を下ガイド11の中央近傍に4~6ヶ配設することでその効果を発揮した。

【0081】またもう一つの特徴としては、定着ヒータ出口B-排紙ニップDを結んだ線分BDが固定リブ24および排紙下ガイド11の入口斜面11a、出口斜面11bよりも常に上方である。

【0082】この条件により、前述したのと同様の理由で、記録材Sは下ガイド11に擦ることがないため、1面目の画像剥がれ等の不具合を起こすことがない。

【0083】本実施の形態の効果は、第2の実施の形態と同様であり、さらに、部品点数が少ないためコストメリットがある。

【0084】なお、本発明は上記した第1、第2および第3の実施の形態に示したフィルム定着器に限らず、従来の熱ロール定着器等、あらゆる定着器において下カール矯正に適用できる。

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【0085】また、本発明は上記各実施の形態に何ら限定されるものではなく、本発明の技術思想内であらゆる変形が可能である。

【0086】

【発明の効果】このように本発明によれば、定着ニップ後の記録材先端の下カール傾向を排紙下ガイド入口側の斜面にて矯正を行うことができる。

【0087】また、本発明によれば、排紙下ガイド出口側の斜面が緩斜面であるので、記録材の搬送を安定化させることができる。

【0088】また本発明によれば、定着ニップ後の記録材先端の下カール傾向を排紙下ガイド入口側の斜面にて矯正を行い、さらに、搬送角度差を利用したしごきによるこし付けにより記録材全域に亘り下カールの矯正を可能にした。

【0089】また本発明によれば、定着ニップ後の記録材先端の下カール傾向を排紙下ガイド入口側の斜面にて矯正を行い、さらに排紙一定着ニップ間での排紙／定着速度差および搬送角度差を利用したしごきによるこし付けにより記録材全域に亘り下カールの矯正を可能にした。

【0090】また本発明によれば、前記排紙下ガイド部の入口斜面を複数のリブにて形成したので、高温高湿環境での薄紙の搬送性を確保しつつ記録材の下カールの矯正を確保可能とした。

【0091】さらに本発明によれば、下ガイド部の入口斜面よりもわずかに突出するように、突出部として回転自在のコロ部材もしくは固定リブを設け、さらに定着一排紙ニップを結んだ直線が常に下ガイド部および前記コロ部材もしくは固定リブ等の突出部より上方としたので、両面印字時の画像剥がれを防止した、下カール矯正定着器の提供が可能となる。

【0092】また本発明によれば、カールの少ない良質の記録材が提供でき、また排出積載性の向上が図られ、両面印字時やADF原稿時のトラブルも低減させる、信頼性のある画像形成装置を提供できる。

【図面の簡単な説明】

【図1】本発明の第1の実施の形態に係る定着器の説明図。

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【図2】図1のガイド部材の斜視図。

【図3】(a)～(c)は図1の定着器の記録材カール矯正の説明図。

【図4】本発明を適用可能な画像形成装置の概略図。

【図5】本発明の第2の実施の形態に係る定着器の断面図。

【図6】図5のガイド部材の斜視図。

【図7】本発明の第3の実施の形態に係る定着器の断面図。

【図8】図7のガイド部材の斜視図。

【図9】(a)(b)はガイドの傾斜角度とカール量関係を説明する図。

【図10】(a)～(c)は本発明の前提となる定着装置による記録材のカール発生を示す図

【図11】従来の定着器の断面図。

【符号の説明】

A 定着ニップ

B 定着ヒータ出口

C 定着ニップ接線の延長線と下ガイド入口斜面の交点

D 排紙ローラニップ

S 記録材

7 加圧ローラ

11 排紙下ガイド

11a 入口斜面

11d 出口斜面

11c 切欠き

11d リブ

12 補強板

13 排紙ローラ

14 排紙コロ

21 コロ部材

22 コロ軸

23 ホルダ

24 固定リブ

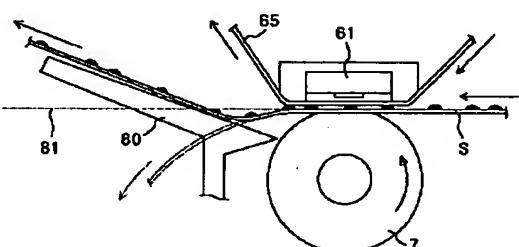
60 ヒーターユニット

61 ヒータ

65 耐熱性フィルム

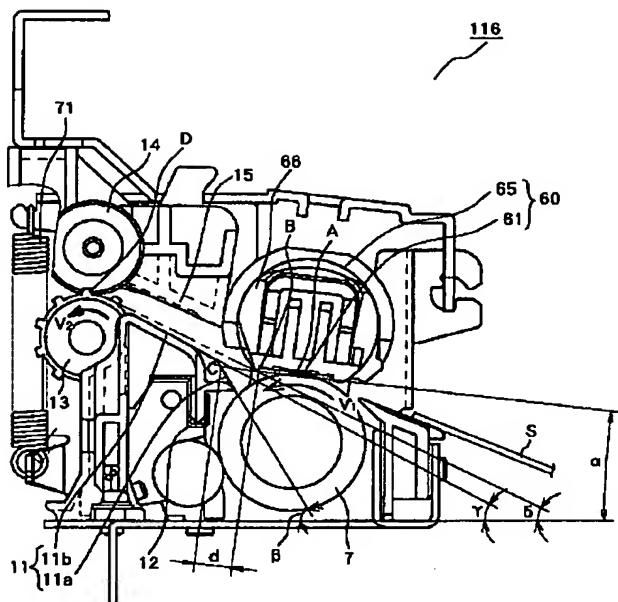
116 定着装置

【図11】

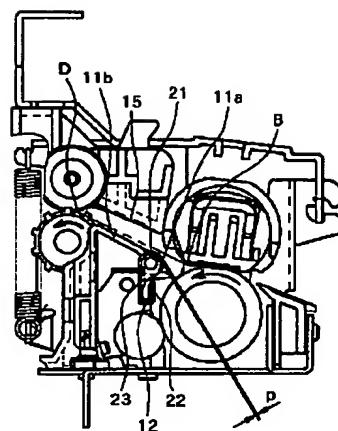


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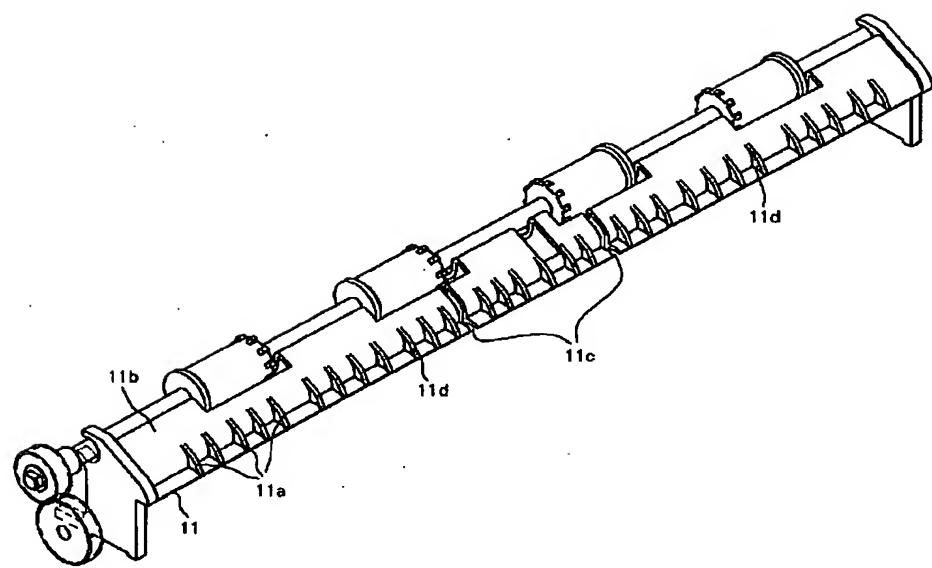
【図1】



【図5】



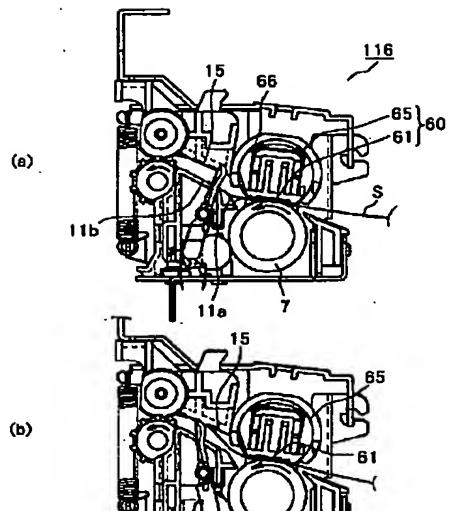
【図2】



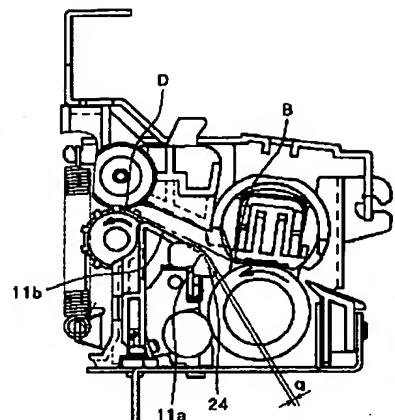
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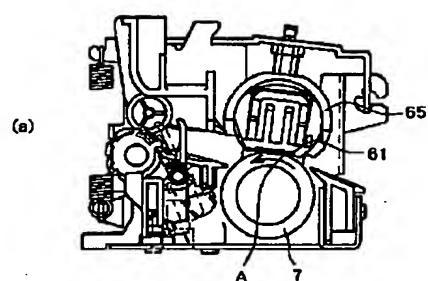
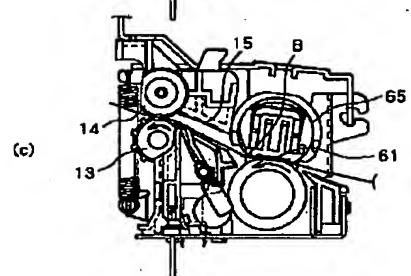
【図3】



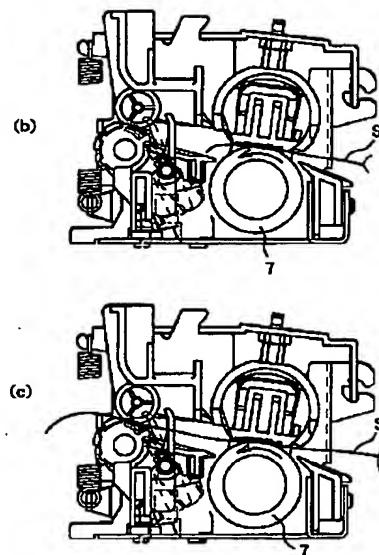
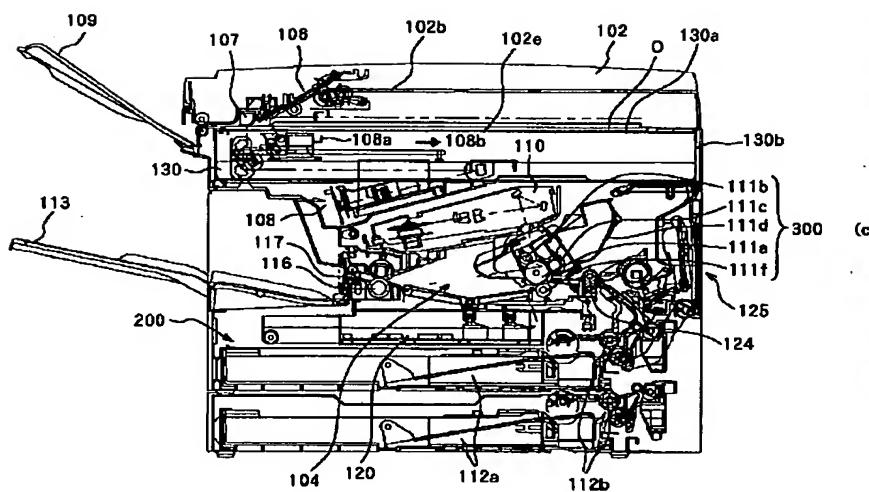
【図7】



【図10】

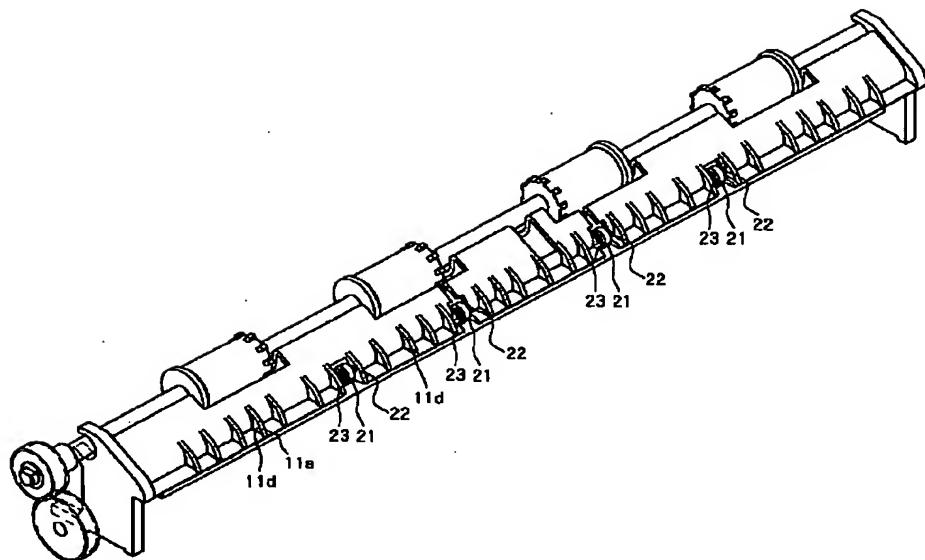


【図4】

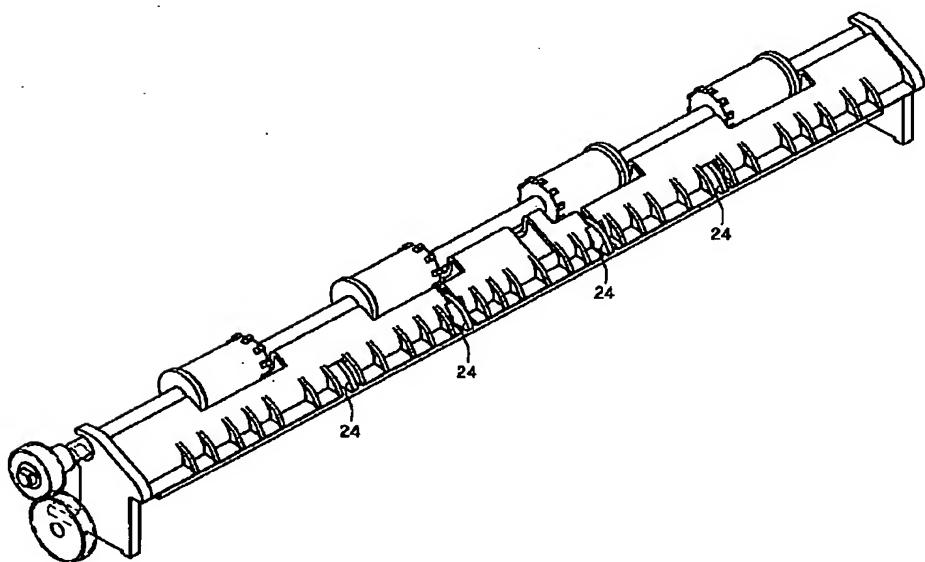


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【図6】



【図8】



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【図9】

